

DRAFT

ENGINEERING EVALUATION

San Francisco Housing Authority
PLANT NO. 18496
APPLICATION NO. 16218

BACKGROUND

The San Francisco Housing Authority of San Francisco, California is applying for an Authority to Construct and/or Permit to Operate a Standby Emergency Generator.

S-1 Stationary Standby Generator Set: Diesel Engine; Make: Cummins; Model: 6BTA5.9-G4 Rated Horsepower: 170 HP;

The standby generator will be located at 227 Bay Street, San Francisco, California 94133.

EMISSIONS SUMMARY

Annual Emissions:

The CARB certified emission factors for S-1 (170 HP- diesel engine) are listed below.

Pollutant	Emission Factors (g/bhp-hr)
NOx	3.89
CO	0.82
POC	0.21
PM10	0.14
SO2	0.000055

**The emission factor for SO2 is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.*

$$SO_2 \quad 8.09E-3 \text{ (\% S in fuel oil) lb/hp-hr} = 8.09E-3 (0.0015\% S) (454 \text{ g/lb}) = 0.000055 \text{ g/hp-hr}$$

S-1

$$\begin{aligned} \text{NOx} &= (3.89 \text{ g/hp-hr}) (170 \text{ hp}) (50 \text{ hr/yr}) (1\text{b}/454\text{g}) = 72.8 \text{ lb/yr} = 0.036 \text{ TPY} \\ \text{CO} &= (0.82 \text{ g/hp-hr}) (170 \text{ hp}) (50 \text{ hr/yr}) (1\text{b}/454\text{g}) = 15.3 \text{ lb/yr} = 0.007 \text{ TPY} \\ \text{POC} &= (0.21 \text{ g/hp-hr}) (170 \text{ hp}) (50 \text{ hr/yr}) (1\text{b}/454\text{g}) = 3.93 \text{ lb/yr} = 0.001\text{TPY} \\ \text{PM10} &= (0.14 \text{ g/hp-hr}) (170 \text{ hp}) (50 \text{ hr/yr}) (1\text{b}/454\text{g}) = 2.62 \text{ lb/yr} = 0.001 \text{ TPY} \\ \text{SO2} &= 0.000055\text{g/hp-hr} (170 \text{ hp}) (50 \text{ hr/yr}) (1\text{b}/454\text{g}) = 0.001 \text{ lb/yr} = 0.000 \text{ TPY} \end{aligned}$$

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.

For S-1:

NOx	=	(3.89 g/hp-hr)	(170 hp)	(24 hr/day)	(lb/454g)	=	34.9 lb/day
CO	=	(0.82 g/hp-hr)	(170 hp)	(24 hr/day)	(lb/454g)	=	7.36 lb/day
POC	=	(0.21 g/hp-hr)	(170 hp)	(24 hr/day)	(lb/454g)	=	1.88 lb/day
PM10	=	(0.14g/hp-hr)	(170 hp)	(24 hr/day)	(lb/454g)	=	1.25 lb/day
SO2	=	(0.000055 g/hp-hr)	(170 hp)	(24 hr/day)	(lb/454g)	=	000 lb/day

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New S-1	Total
NOx	0	0.036	0.036
CO	0	0.007	0.007
POC	0	0.001	0.001
PM10	0	0.001	0.001
SO2	0	0.000	0.000

Toxic Risk Screening:

The toxic emission of diesel particulate does exceed the District Risk Screening Trigger, as shown in Table (1) below, and a Risk Screening Analysis is necessary.

Table 1. Calculated incremental increase in diesel exhaust particulate matter for S-1

Source:	PM ₁₀ Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year) ¹	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.14	170	50	2.62	0.58	Yes

Per the attached 7/24/2007 memo from Irma Salinas, results from the health risk screening analysis, the maximally exposed industrial receptor is 0.9 in a million for 50 hours of operation per year. In accordance with the District's Regulation 2-5, this risk level is considered acceptable as the engine meets current TBACR requirements.

STATEMENT OF COMPLIANCE

The owner/operator of S-1 shall comply with Reg. 6 (Particulate Matter and Visible Emissions Standards) and Reg. 9-1-301 (Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations). Since this engine meets TBACT for PM10 (<0.15 g/hp-hr), it is expected to comply with Reg. 6. Ultra-low sulfur diesel (15 PPM sulfur) will be used to meet the sulfur limitation of 0.5wt% in Reg. 9-1-304 as well as to minimize PM10 emissions. Because S-1 is an emergency standby generator, Reg. 9-8-110 (Inorganic Gaseous Pollutants: Nitrogen Oxides from Stationary Internal Combustion Engines) exempts the requirements for emission limits of Sections 9-8-301, 302, and 502. Allowable operating hours and the corresponding record keeping in Reg. 9-8-330 and 530 will be included in the Permit Conditions below.

This diesel engine is subject to the Stationary Diesel Airborne Toxics Control Measure (ATCM) and is considered a new stationary emergency standby diesel engine since it will

be installed after January 1, 2005 and is larger than 50 HP. The requirements of the ATCM will be included in the permit conditions.

The project is considered to be ministerial under the District's CEQA regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emissions factors and therefore is not discretionary as defined by CEQA. (Permit Handbook Chapter 2.3)

The project is within 1000 feet from the nearest school and therefore is subject to the public notification requirements of Reg. 2-1-412.

Best Available Control Technology:

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NO_x, CO, SO₂ or PM₁₀.

Based on the emission calculations above, the owner/operator of S-1 is subject to BACT for the following pollutants: NO_x and CO. BACT 1 levels do not apply for 'engines used exclusively for emergency use during involuntary loss of power' as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to meet BACT 2 limits presented below.

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
NO _x	1. 1.5 g/bhp-hr [107 ppmvd @ 15% O ₂] ^{a,b} 2. 6.9 g/bhp-hr [490 ppmvd @ 15% O ₂] ^{a,b,c} 3. 6.9 g/bhp-hr [490 ppmvd @ 15 % O ₂] ₂	1. Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler ^{a,b} 2. Timing Retard $\leq 4^\circ$ + Turbocharger w/ Intercooler ^{a,b,c} 3. Timing Retard $\leq 4^\circ$ + Turbocharger w/ Intercooler

The NOx emission limits set by BACT 2 are met, as shown in Table (2).

Table (2)

Pollutant	Engine Emission Factors (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
NOx	3.89	6.9	YES

Therefore, S-1 is determined to be in compliance with the BACT 2 limits for NOx.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NOx. Based on the emission calculations above, offsets are not required for this application.

NSPS: The engine is not subject to the standards in 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines because it is a 2005 model. However, it is subject to the deadline in Section 40.4208(a) that states that an engine that does not comply with the 2007 standards shall not be installed after December 31, 2008. This deadline has been incorporated into Permit Condition 23671.

NESHAP: This engine is not subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, because it is not located at a major facility for hazardous air pollutants.

PSD does not apply.

PERMIT CONDITIONS

Application 16218: San Francisco Housing Authority: Plant 18496:
Conditions for S-1

Authority to Construct Condition 23671

This engine shall not be installed after December 31, 2008.

[40 CFR 60.4208(a)]

PC 22850

- 1. Operating for reliability-related activities is limited to 50 hours per year per engine.**

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(B)(3) or Regulation 2-5]

- 2. The owner or operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, state or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating while mitigating emergency conditions or while emission testing to show compliance with District, state or Federal emission limits is not limited.**

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3)] or (e)(2)(B)(3)]

- 3. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained.**

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(4)(G)(1)]

- 4. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 36 months from the date of entry (60 months if the facility has been issued a Title V Major Facility Review Permit or a Synthetic Minor Operating Permit). Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.**
 - a. Hours of operation for reliability-related activities (maintenance and testing).**
 - b. Hours of operation for emission testing to show compliance with emission limits.**
 - c. Hours of operation (emergency).**
 - d. For each emergency, the nature of the emergency condition.**
 - e. Fuel usage for each engine(s).**

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(4)(I), (or, Regulation 2-6-501)]

- 5. At School and Near-School Operation: If the emergency standby engine is located on school grounds or within 500 feet of any school grounds, the following requirements shall apply:**

The owner or operator shall not operate each stationary emergency standby diesel-fueled engine for non-emergency use, including maintenance and testing, during the following periods:

- f. Whenever there is a school-sponsored activity (if the engine is located on school grounds).**
- g. Between 7:30 a.m. and 3:30 p.m. on days when school is in session.**

"School" or "School Grounds" means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). "School" or "School Grounds" includes any building or structure, playground, athletic field, or other areas of school property but does not include unimproved school property.

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(1)] or (e)(2)(B)(2)]

RECOMMENDATION

Issue an Authority to Construct to the San Francisco Housing Authority of San Francisco for:

S-1 Stationary Standby Generator Set: Diesel Engine; Make: Cummins; Model: 6BTA5.9-G4 Rated Horsepower: 170 HP;

EXEMPTIONS

None.

By: _____ Date: 7/9/07
Sheryl Wallace
Air Quality Permit Technician